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PATENT SPECIFICATION

717,699

Inventor: WILLIAM CHARLES SCRIVENER

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COMPLETE SPECIFICATION

Improvements in or relating to Concrete Base Units in combination with Tapering Tubular Metal Poles

We, MASTS LIMITED, a British Company, of Nickel Works, Tyburn Road, Edlington, Birmingham, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention is for improvements in or relating to concrete base units (hereinafter referred to for convenience as "base units") in combination with tapering tubular metal poles. As will be readily appreciated, the upper part of a base unit, when erected in an upright position, extends a considerable distance above the ground or other surface in which the unit is planted, so as in effect to form a part of the pole at the lower end thereof. The invention has for its object the provision of a base unit in combination with a tapering tubular metal pole, the base of which can be produced either by centrifugally spinning or vibrating the concrete in order to consolidate the mix, or made near the site where the poles are to be erected, in which case consolidation of the concrete mix would be effected by hand tamping instead of by mechanical vibration or spinning of the moulds.

According to the present invention there is provided a concrete base or base unit in combination with a tapering tubular metal pole, wherein the external surface at one end of the base unit is provided with a taper which conforms to the taper of the internal surface of the lower end of the pole or lowermost pole section in the case of a pole constructed in sections, and provides sufficient transverse strength to support the pole in an upright position when the other end of the base or base unit is planted in a supporting surface with the base or base unit upright.

If desired, there may be a plurality (e.g. two) of such tapers at said end of the base or base unit, for the reception of a corresponding plurality of poles or lowermost pole sections of respectively different diameter, in which case a preferred arrangement is one in which the two or more tapers extend along adjacent portions of the same surface of the base or base unit.

The invention will be more particularly

described with reference to the accompanying drawing, in which:—

Figure 1 illustrates partly in section the lower end of a tapering tubular steel pole mounted upon a concrete base constructed in accordance with the present invention;

Figure 2 is a section of Figure 1 on the line A--A;

Figure 3 illustrates partly in section the lower end of a tapering tubular steel pole mounted upon a concrete base constructed in accordance with the present invention;

Figure 4 illustrates a section on the line B--B of Figure 3;

Figure 5 illustrates a section on the line C--C of Figure 3;

Figure 6 illustrates partly in section the lower end of a tapering tubular steel pole mounted upon a concrete base constructed in accordance with the present invention;

Figure 7 illustrates a section on the line D--D of Figure 6;

Figure 8 illustrates the lower end of a tapering tubular steel pole mounted upon a concrete base constructed in accordance with the present invention;

Figure 9 is a side elevation of the concrete base illustrated in Figure 8;

Figure 10 illustrates on an enlarged scale a section on the line E--E of Figure 8;

Figure 11 illustrates on an enlarged scale a section of Figure 8 on the line F--F;

Figures 10A and 11A are views similar to Figures 10 and 11 but illustrating a slightly different cross-sectional form for the lower part of the concrete base illustrated in Figures 8 and 9;

Figure 12 illustrates in section the upper free end of a concrete base or base unit in accordance with the invention, erected in an upright position showing means for indicating the position of the reinforcing members of the base or unit;

Figure 13 illustrates a concrete base generally similar to the concrete base illustrated in Figures 8 to 11 (if desired it could have the cross-section illustrated in Figures 10A and 11A) but constructed with two tapers as hereinbefore described;

Figure 14 is a side elevation of the concrete base illustrated in Figure 13.

Figure 15 illustrates on an enlarged scale a section on the line G—G of Figure 13;

Figure 16 is a fragmentary longitudinal section through a concrete base generally similar to the concrete base illustrated in Figures 3 to 5 but also having two tapers as hereinafter more particularly described;

Figures 17, 18 and 19 are respectively cross-sectional views through the lower portion of the concrete base or base unit of the present invention, illustrating various alternative forms of this portion giving in each case a larger door opening (as hereinafter more particularly referred to) than is possible with the form illustrated in Figures 6 and 7.

Like reference numerals are applied to like parts in the various figures.

Referring to the drawings, Figures 1 and 2 illustrate a hollow concrete base 1 which tapers uniformly from one end to the other and is provided in the wall thereof with a series of metal reinforcing rods 2 which extend in the longitudinal direction of the base and are arranged equidistant from one another on a circle around the axis of the base. The exterior of the said one end of the base is provided with a taper which corresponds to the taper of the internal surface of the lower end of a tapering tubular steel pole 3. The pole 3, when placed in position upon the said one end of the base, permits the said end of the base to extend into the interior thereof and form a close fit with the internal surface of the pole.

Figures 3, 4 and 5 illustrate a concrete base similar to that illustrated in Figures 1 and 2 with the exception that the taper of the base is not uniform, the said other end of the base being provided with an outwardly extending shoulder 4 which results in the said other end of the base being of larger diameter than it would be if the taper of the said one end of the base were continued downwardly in a uniform manner. It will be observed that in the said other end of the base the reinforcing rods 2 are divided into two diametrically opposed groups, as distinct from the arrangement of the rods in the said one end of the base, where all the rods are arranged equidistant from one another.

Referring to Figures 6 and 7, the lower end of a tapering tubular steel pole 3 is mounted upon the said one end 5 of a concrete base 1. Adjacent the said one end 5 of the base is a shoulder 6. Below this shoulder the base may have any desired configuration, for example that illustrated in Figure 6, and it is preferably provided with an opening 7 normally closed by a door 8, to provide access to the interior of the said other end of the base, which in the construction illustrated in Figure 6 is of considerably larger diameter

than the said one end. That portion of said other end of the base which, when the base is erected upright, normally extends below the ground level is provided with a further aperture 9 through which cables, wires, conduits or the like which are normally disposed below the ground level may be introduced into the interior of the base. Further, the base shown is provided interiorly with a fitting 14 upon which may be mounted an instrument or instruments or an instrument panel, for example, in the case of a street lighting pole, a panel incorporating chokes, condensers, fuses, switches and like control mechanism for the lantern.

Referring to Figures 8, 9, 10 and 11, these figures illustrate a concrete base in which the said one end 5 thereof is conical in shape and adapted to receive the lower end of a tapering tubular steel pole, whilst the other end of the base is shaped so that it is provided with two concave faces 10 and 11 diametrically opposed to one another, which faces are joined at their extremities by two diametrically opposed convex faces 12 and 13 as clearly illustrated in Figures 10 and 11. The advantage of such a construction is that complicated interior shapes as in the case of a hollow base are not required although the said one end which extends into the pole may, if necessary, be formed hollow by means of a simple core which may be easily withdrawn. With the base illustrated in Figures 8, 9, 10 and 11 it will be observed that for the most part the structure is solid in contrast to the arrangements illustrated in Figures 1 to 7. By shaping the lower portion of the base in the manner illustrated in Figures 8, 9, 10 and 11 a considerable economy in concrete is effected, as the said other end of the base which, in the use thereof, extends beneath the ground level is provided with a downwardly decreasing taper in the manner illustrated in Figures 8 and 9. The base illustrated in Figures 8, 9, 10 and 11 is of particular application to poles adapted to carry overhead wires, where the strength in the longitudinal direction of the wires need only be about one quarter of the strength in the transverse direction, where the full wind loading is most marked and the bending of the pole is in the nature of a cantilever taper 5. Further, with the construction illustrated in Figures 8, 9, 10 and 11, the number of reinforcing rods is considerably reduced as the rods are placed in the optimum position for resisting said transverse loads.

Referring to Figures 10A and 11A, it will be seen that the cross-sectional form for the said other end of the concrete base illustrated in these figures is one in which the section is substantially I-shaped, otherwise the

construction is as described with reference to Figures 8 to 11.

Figures 13, 14 and 15 illustrate a concrete base in accordance with the invention, the construction of which is generally similar to that of the base illustrated in Figures 8 to 11 (or Figures 8, 9, 10A and 11A). It will be seen, however, that whereas the base illustrated in these earlier figures is designed for the reception of one tubular pole or lowermost pole section only and is formed accordingly with a single taper 5, the base illustrated in Figures 13 to 15 is formed with two tapers 5 and 5a for the reception respectively of two tubular poles or lowermost pole sections 3 and 3a, the two tapers 5 and 5a extending along adjacent portions of the said one end of the base.

In addition, the base illustrated in Figures 13 to 15 is formed with a hole 15 extending along the axis of the base from the upper extremity of the said one end thereof to a point below the lower end of the larger taper 5, at which point the hole communicates with an aperture 16 extending completely through the thickness of the base in the manner clearly shown in the figures. The purpose of this hole 15 is to accommodate a wire rope used in connection with a winch for drawing the pole or pole sections onto the concrete base in the operation of assembling the pole on the base. The hole may also be useful in introducing electric cables into the interior of the pole and further it provides for drainage of moisture resulting from condensation on the interior of the pole, such moisture draining through the hole and thence to the exterior of the base by way of the aperture 16. The lower end of the hole 15 is reinforced with a galvanised steel plate 17 cast into the base and adapted to suit the ferrule of the wire rope above referred to.

It will be understood, of course, that any of the above constructions could equally well be employed in the case of a base unit, the only essential difference between a "base" and a "base unit" being that the portion of the structure which extends above the ground is longer in the case of a base unit than in the case of a base.

It will also be understood that by providing the concrete base or base unit of this invention with a plurality of tapers in the manner hereinbefore described the number of sizes of bases or base units manufactured and carried in stock for use with poles of correspondingly varying sizes can be reduced.

It will further be understood that a base or base unit generally in accordance with Figures 6 and 7 may similarly be provided with a plurality of tapers to take a corresponding plurality of poles or lowermost

pole sections, the general form of the base or base unit below the lowermost of these tapers being similar to that of said base of Figures 6 and 7.

Figure 16 is a view similar to Figure 3, but illustrating a construction in which the base or base unit is generally similar to the base of Figures 3 to 5 but is designed as in the case of the base of Figures 13 to 15 with two tapers 5 and 5a adapted to receive respectively two poles or lowermost pole sections 3 and 3a of respectively different diameter.

Referring finally to Figures 17, 18 and 19, it will be seen that owing to the particular cross sectional shape of the lower portion of the concrete base or base unit as compared with the shape illustrated in Figures 6 and 7, it is possible in the case of each of the three forms of invention illustrated respectively in the three Figures 17, 18 and 19 to employ an opening 7 of considerably larger width dimension as compared with that which is possible with the construction according to Figures 6 and 7.

It will also be seen that Figures 18 and 19 illustrate constructions in which the said other end of the base or base unit is hexagonal. It will be appreciated, however, that the lower portion of the base or base unit may be of any other cross sectional shape, polygonal or otherwise.

The said one end of the base or base unit which in the use of the base or unit extends into the lower end of the tapering tubular pole or lowermost pole section may, in any of the constructional forms of the invention illustrated, similarly be of any desired cross-sectional shape, for example circular, hexagonal or other polygonal shape according to the interior shape of the lower end of the pole, or pole section, and where accuracy of the said one end of the base, or base unit, is important a preformed metal sleeve of the precise dimensions to fit accurately into the interior of the lower end of the pole or pole section is cast on the external surface of the said one end of the base or base unit.

In order to economise in the reinforcing rods which are employed in the base it is possible to arrange them in groups diametrically opposed to one another and at right angles to the maximum tensile or compressive stresses which are likely to arise. When the rods are arranged in the base or base unit in groups in the manner indicated it is necessary to provide indicating means on the exterior of the base or base unit in order to show where the groups of rods are located. This indication may take the form (see Figure 12) of two diametrically opposed longitudinal grooves formed in the external surface of the base or base unit and these grooves may be provided in or may extend

along that portion of the base or base unit or the said one end thereof which extends into the lower end of the pole or lowermost pole section so as to provide drainage for any moisture which may accumulate in the lower end of the pole.

The reinforcement employed in bases and base units in accordance with the present invention may be of the initially unstressed type, or alternatively, of the prestressed type.

Thus it will be seen that there is provided according to the present invention a concrete base unit in combination with a tapering tubular metal pole which is particularly suitable where the soil in which the pole is planted contains constituents which tend to have a corroding action upon unprotected metal. We are aware of United Kingdom Patent Specification No. 426,074 and we do not claim any of the features illustrated in, or described with reference to Figure 1 of the drawings of that specification. Subject to the above disclaimer.

What we claim is:—

1. A concrete base or base unit in combination with a tapering tubular metal pole, wherein the external surface at one end of the base unit is provided with a taper which conforms to the taper of the internal surface of the lower end of the pole or lowermost pole section in the case of a pole constructed in sections, and provides sufficient transverse strength to support the pole in an upright position when the other end of the base or base unit is planted in a supporting surface with the base or base unit upright.

2. A concrete base or base unit in combination with a tapering tubular metal pole as claimed in Claim 1, wherein the concrete is reinforced.

3. A concrete base or base unit in combination with a tapering tubular metal pole as claimed in either of the preceding claims, wherein at least that portion thereof which is beneath the end which receives the lower end of the pole or lowermost pole section is of hollow construction.

4. A concrete base or base unit in combination with a tapering tubular metal pole as claimed in Claim 3, wherein the hollow portion forms a compartment having a closable opening providing ready access to the interior of the compartment.

5. A concrete base or base unit in combination with a tapering tubular metal pole as claimed in Claim 4, wherein that part of the hollow portion which extends into the supporting surface is provided with an opening for the reception of cables, wires, conduits or the like normally disposed below supporting surface level.

6. A concrete base or base unit in com-

bination with a tapering tubular metal pole as claimed in Claim 4 or Claim 5, wherein means are provided in the hollow portion to serve as a mounting for an instrument or instruments or an instrument panel.

7. A concrete base or base unit in combination with a tapering tubular metal pole as claimed in any of the preceding claims, wherein the external surface thereof has a uniform continuous taper.

8. A concrete base or base unit in combination with a tapering tubular metal pole as claimed in any of the preceding Claims 1 to 6, wherein the external surface of the lower portion thereof conforms to a configuration other than that of the end which extends into the lower end of the pole or lowermost pole section.

9. A concrete base or base unit in combination with a tapering tubular metal pole as claimed in Claim 1 or Claim 2, wherein the other end portion thereof is solid and is provided with two diametrically opposed concave surfaces.

10. A concrete base or base unit in combination with a tapering tubular metal pole as claimed in Claim 9, wherein the concave surfaces are joined by two diametrically opposed convex surfaces.

11. A concrete base or base unit in combination with a tapering tubular metal pole as claimed in Claim 9 or Claim 10, wherein the other end thereof tapers downwardly and outwardly and thereafter downwardly and inwardly.

12. A concrete base or base unit in combination with a tapering tubular metal pole as claimed in any of the preceding claims, except Claim 7, wherein there are a plurality (e.g. two) of tapers at the said one end of the base or base unit, for the reception of a corresponding plurality of poles or lowermost pole sections of respectively different diameter.

13. A concrete base or base unit in combination with a tapering tubular metal pole as claimed in Claim 12, wherein the two or more tapers extend along adjacent portions of the same surface of the base or base unit.

14. A concrete base or base unit in combination with a tapering tubular metal pole as claimed in any one of the preceding claims, wherein the taper or tapers are sheathed with an outer metal sleeve cast onto the base or base unit and arranged to receive the lower end of the pole or lowermost pole section.

15. A concrete base or base unit in combination with a tapering tubular metal pole as claimed in any of the preceding claims, wherein the said one end thereof is solid apart from a hole extending through it leading to the interior space of the said other end

of the base or base unit, in the case of a base or base unit the said other end of which is hollow, or to the exterior surface of the base or base unit, in the case of a base or base unit whereof the said other end is solid, said hole serving to accommodate a wire rope used in the operation of assembling the base or base unit and the pole or lowermost pole section and/or electric cables or the like leading up into the pole from the base.

16. A concrete base or base unit in combination with a tapering tubular metal pole as claimed in any one of the preceding claims, wherein reinforcements comprising a series of metal rods are arranged around the axis thereof.

17. A concrete base or base unit in combination with a tapering tubular metal pole as claimed in Claim 16, wherein the metal rods are arranged in two groups disposed diametrically opposite one another.

18. A concrete base or base unit in combination with a tapering tubular metal pole,

as claimed in Claim 17, wherein the said one end thereof is provided with means for indicating the positions of the groups of reinforcing rods.

19. A concrete base or base unit in combination with a tapering tubular metal pole as claimed in Claim 18, wherein the said indicating means comprise grooves which serve as means for draining away any moisture which collects in the lower end of the pole.

20. A concrete base or base unit in combination with a tapering tubular metal pole constructed, arranged and adapted to function substantially as hereinbefore described with reference to Figures 1 and 2 or Figures 3, 4 and 5 or Figures 6 and 7 or Figures 8, 9 10 and 11 or Figures 10A and 11A or Figure 12 or Figures 13, 14 and 15 or Figure 16 or any of the Figures 17, 18 and 19, of the accompanying drawings.

G. F. REDFERN & CO.,
Redfern House, Dominion Street,
London, E.C.2.

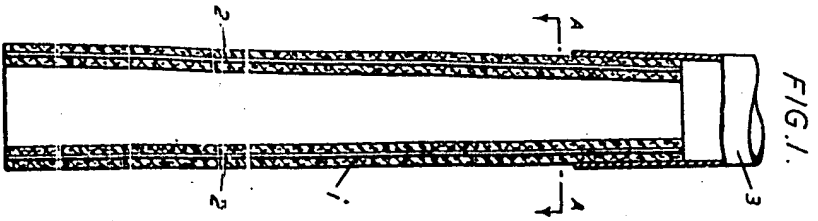


FIG. 1.

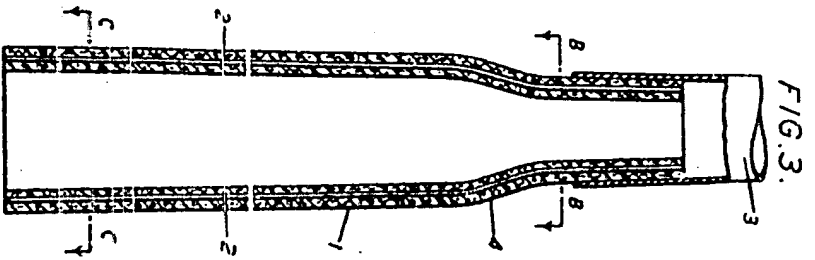


FIG. 3.

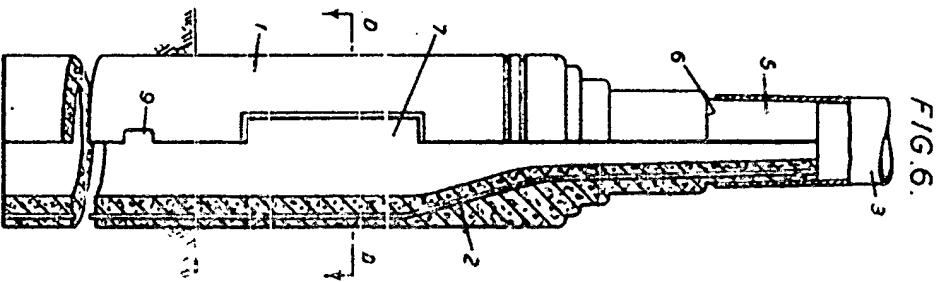


FIG. 6.

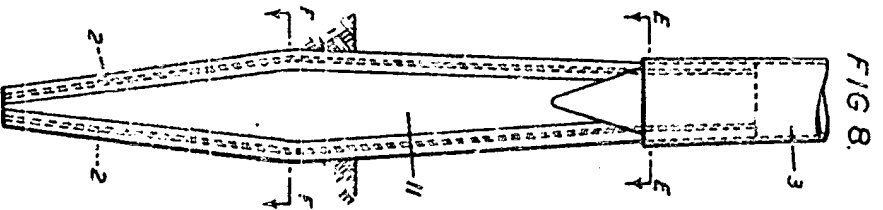


FIG. 8.

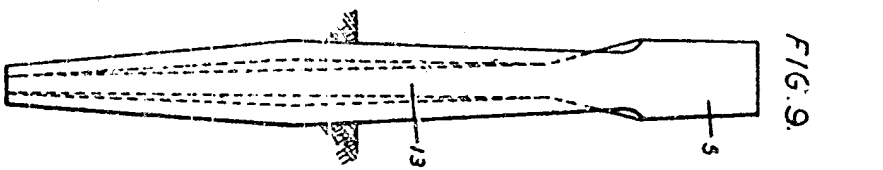


FIG. 9.

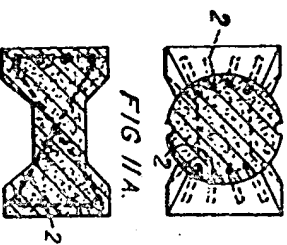


FIG. 10A.

FIG. 11A.

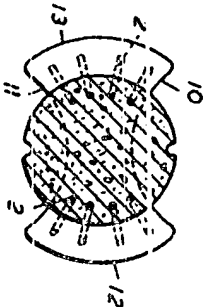


FIG. 10.

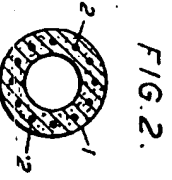


FIG. 2.

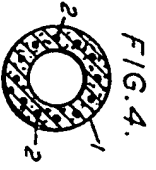


FIG. 4.

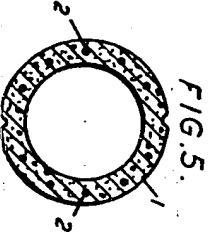


FIG. 5.

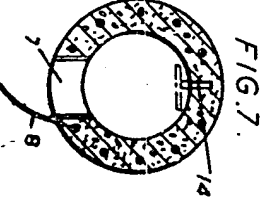


FIG. 7.

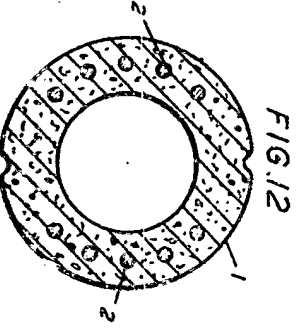


FIG. 12.

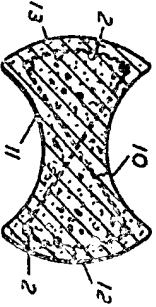


FIG. 11.

717,699

COMPLETE SPECIFICATION

2 SHEETS

This drawing is a reproduction of the Original on a reduced scale.

SHEET 2

